

NO CALCULATOR FOR THIS PAGE

Evaluate each expression showing all work.

$$1. \frac{(14 - 4^2)^2}{(4 - 2)} + 3^4 \div 3$$

$\frac{(14 - 16)^2}{2} + 81 \div 3$   
 $\frac{2 + 27 = 29$

$$3. \frac{1}{2}(80 \div 8) + 2^3 - 4 \times 2$$

$\frac{1}{2}(10) + 8 - 8$   
 $5$

$$2. -2 + [18 \div (9 - 2 \cdot 3)]$$

$-2 + 18 \div 3$   
 $-2 + 6 = 4$

$$4. 8 - 2 \cdot 3 + 3$$

$8 - 6 + 3$   
 $5$

$$5. \frac{(x^3 y^{-2} z)^{-2}}{x y^{-3} z^5}$$

$$\frac{x^{-6} y^4 z^{-2}}{x y^{-3} z^5}$$

$$\frac{y^7}{x^7 z^7}$$

$$7. \left(\frac{3}{2}\right)^2$$

$$\left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

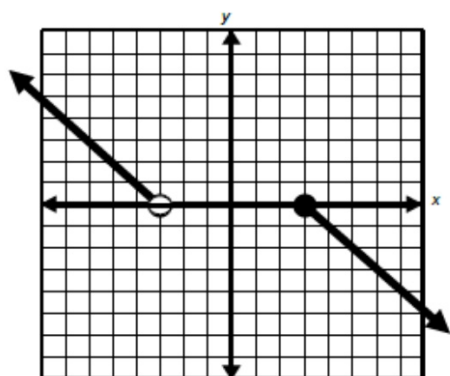
$$6. (a^{20} b^6 c^{-17})^0$$

$$1$$

$$8. \left(\frac{1}{216}\right)^{\frac{2}{3}}$$

$$\left(\frac{1}{216}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\frac{1}{216}}\right)^2 = \left(\frac{1}{6}\right)^2 = \frac{1}{36}$$

State if the following relation is a function. Then find the domain and range.

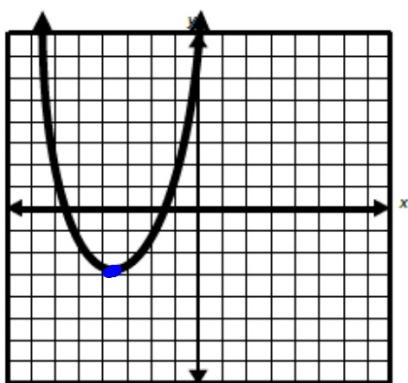


9. FUNCTION? Y or N  
(circle one)

10. Domain:  $(-\infty, -3) \cup$

11. Range:  $[3, \infty)$

$(-\infty, \infty)$



12. FUNCTION? Y or N  
(circle one)

13. Domain:  $(-\infty, \infty)$

14. Range:  $[-3, \infty)$

Determine the following using the given functions.

$$f(x) = x^2 - 1 \text{ and } g(x) = 2x - 3$$

15.  $f + g$

$$(x^2 - 1) + (2x - 3)$$

$$x^2 - 1 + 2x - 3$$

$$\boxed{x^2 + 2x - 4}$$

16.  $f \cdot g$

$$(x^2 - 1)(2x - 3)$$

$$2x^3 - 3x^2 - 2x + 3$$

Determine the following using the given functions.

$$f(x) = x^2 - 1 \text{ and } g(x) = 2x - 3$$

17.  $f(g(x))$

$$f(2x-3)$$

$$(2x-3)^2 - 1$$

$$(2x-3)(2x-3) - 1$$

$$4x^2 - 6x - 6x + 9 - 1$$

$$4x^2 - 12x + 8$$

18.  $g(f(x))$

$$g(x^2-1)$$

$$2(x^2-1) - 3$$

$$2x^2 - 2 - 3$$

$$2x^2 - 5$$

Determine the following using the given functions.

$$f(x) = x^2 - 1 \text{ and } g(x) = 2x - 3$$

19. Find  $g^{-1}(x)$

①

$$y = 2x - 3$$

②

$$x = 2y - 3$$

③

$$\begin{array}{r} x = 2y - 3 \\ +3 \quad +3 \\ \hline x + 3 = 2y \\ \frac{x + 3}{2} = \frac{2y}{2} \end{array}$$

④

$$\frac{x + 3}{2} = y$$
$$g^{-1}(x) = \frac{x + 3}{2}$$

20. Find  $f^{-1}(x)$

①

$$y = x^2 - 1$$

②

$$x = y^2 - 1$$

③

$$\begin{array}{r} x = y^2 - 1 \\ +1 \quad +1 \\ \hline x + 1 = y^2 \end{array}$$

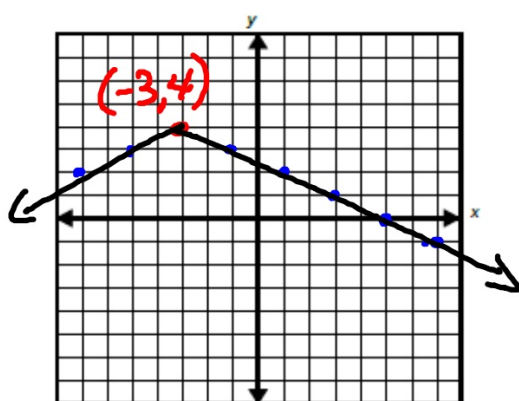
$$\sqrt{x + 1} = y$$

④

$$f^{-1}(x) = \sqrt{x + 1}$$

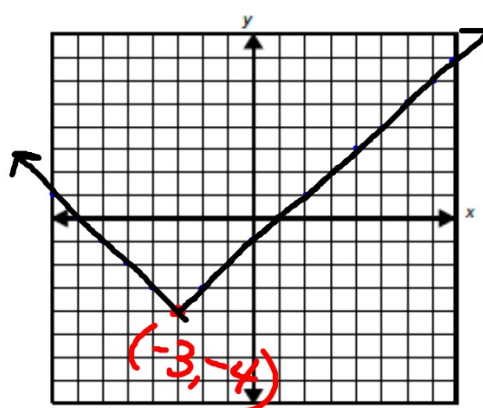
Graph the following. Be sure to label the vertex.

21.  $f(x) = -\frac{1}{2}|x+3|+4$



$h = \underline{-3}$   $k = \underline{4}$   
slope =  $-\frac{1}{2}$

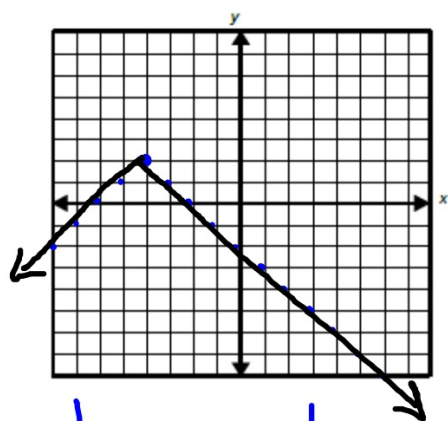
22.  $f(x) = |x+3|-4$



$h = \underline{-3}$   $k = \underline{-4}$   
slope =  $1$

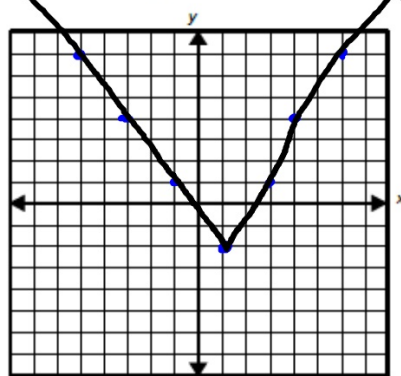


23.  $f(x) = -|x + 4| + 2$



$h = -4$   $k = 2$   
 slope = -1

24.  $f(x) = \frac{3}{2}|x - 1| - 2$



$h = 1$   $k = -2$   
 slope =  $\frac{3}{2}$

Identify each transformation from the parent function to the given  $f(x)$ .

29.  $f(x) = \frac{1}{2}|x - 3| + 2$  Transformation  
vertical compression by a factor of  $\frac{1}{2}$ ;  
Shift RIGHT 3 units; Shift UP 2 units
30.  $f(x) = -2|x| + 2$  reflection over 'x' axis;  
Vertical stretch by a factor of 2  
Shift UP 2 units
31.  $f(x) = |x - 4| - 6$  \_\_\_\_\_

Write the function for each graph described below.

32. the graph of  $f(x) = |x|$  translated 10 units to the left and 3 units up and reflected over the x-axis.

$$f(x) = -|x+10| + 3$$

33. the graph of  $f(x) = |x|$  vertically stretched by a factor of 2, and translated 8 units to the right.

$$f(x) = 2|x-8|$$

34. the graph of  $f(x) = |x|$  vertically compressed by a factor of  $\frac{1}{4}$ , reflected over the x-axis and translated 4 units down.

$$f(x) = -\frac{1}{4}|x| - 4$$